



FIG. 1A

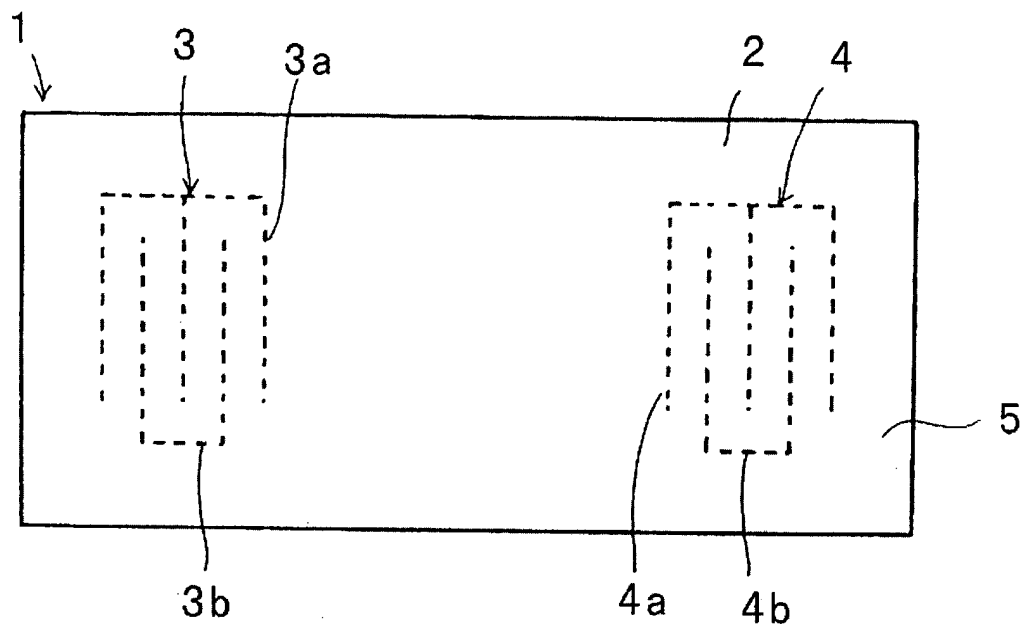


FIG. 1B

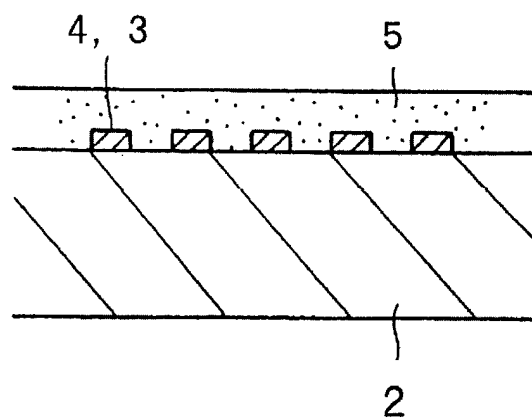


FIG. 2

Electromechanical coupling coefficient  $K^2$  of Rayleigh wave when ZnO thin film with Euler angles  $(0^\circ, 0^\circ, 0^\circ)$  is formed on quartz substrate with Euler angles  $(0^\circ, 119.75^\circ, 35^\circ)$

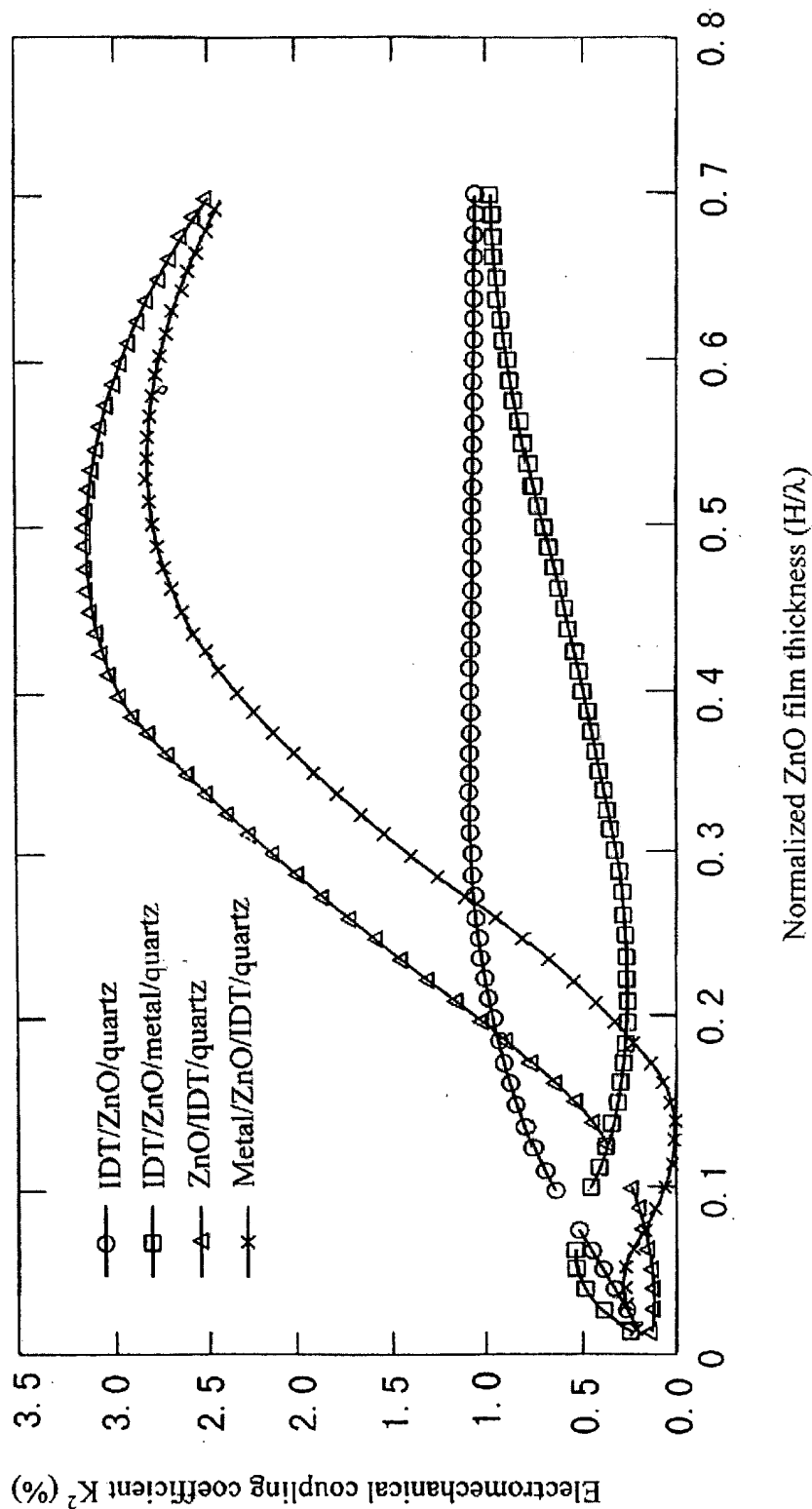




FIG. 3

Electromechanical coupling coefficient  $K^2$  of Rayleigh wave when ZnO thin film with Euler angles  $(0^\circ, 180^\circ, 0^\circ)$  is formed on quartz substrate with Euler angles  $(0^\circ, 119.75^\circ, 35^\circ)$

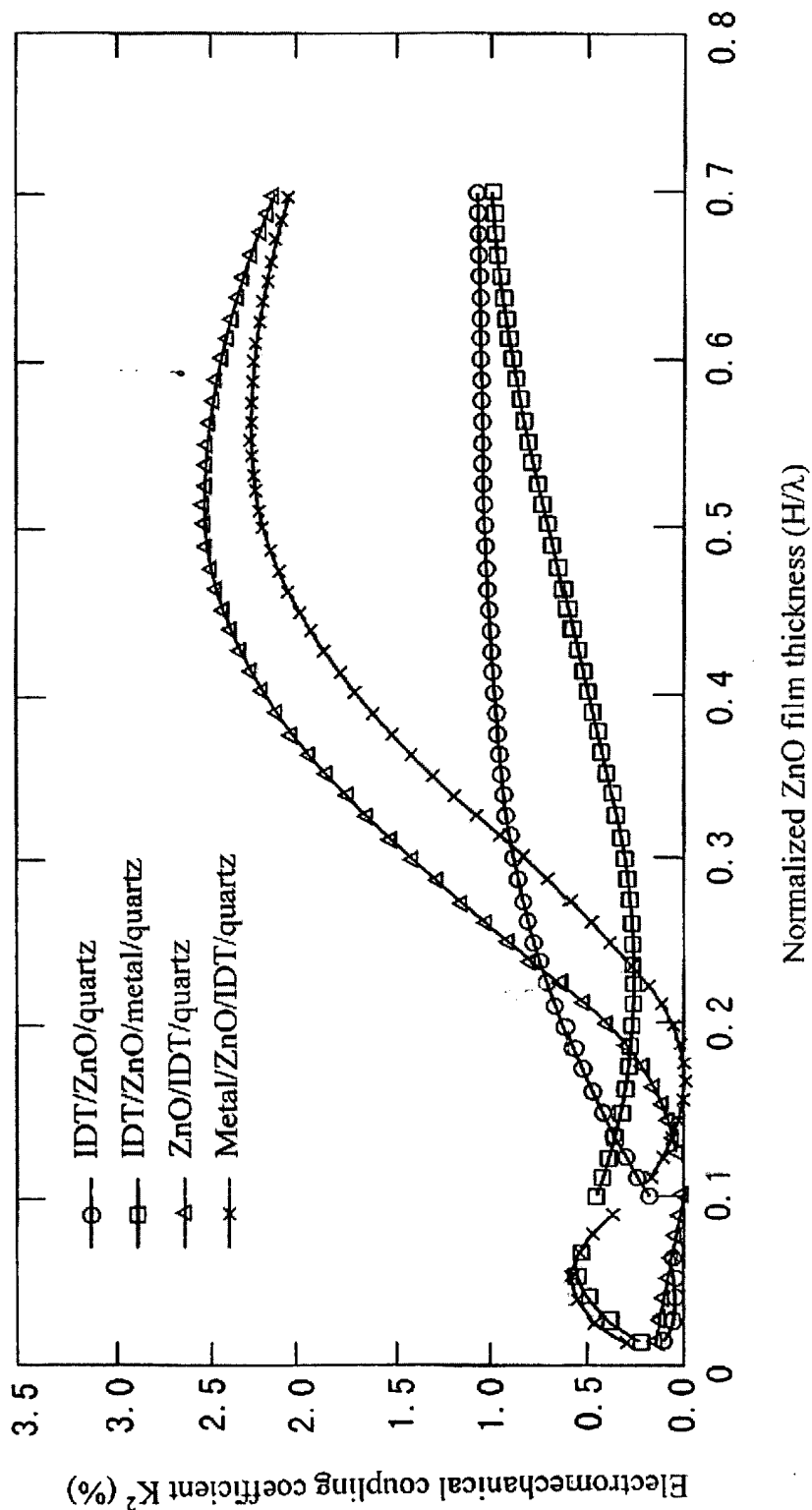




FIG. 4

Electromechanical coupling coefficient  $K^2$  of Rayleigh wave when ZnO thin film with Euler angles  $(0^\circ, 0^\circ, 0^\circ)$  is formed on quartz substrate with Euler angles  $(0^\circ, 119.75^\circ, 35^\circ)$

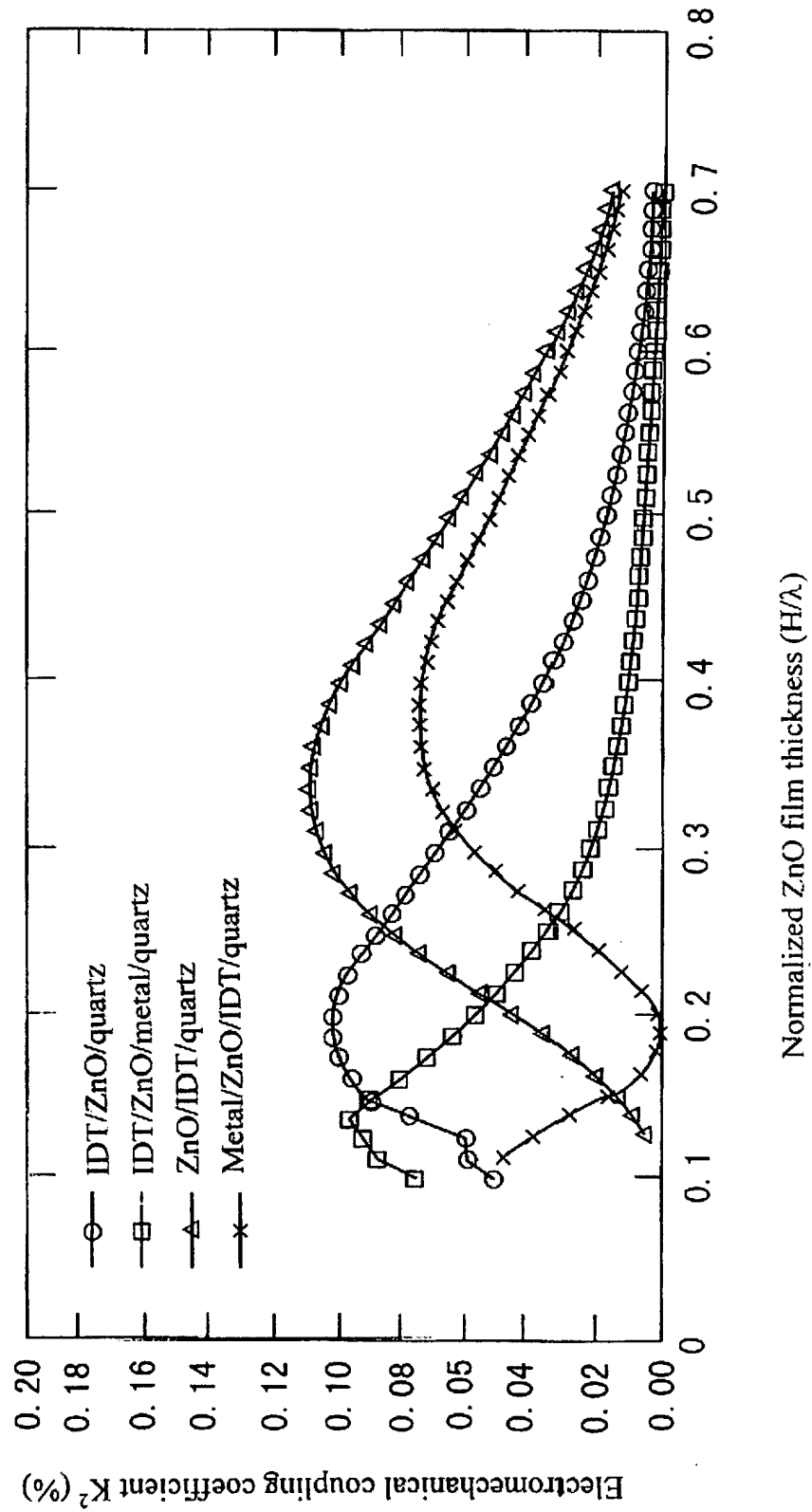


FIG. 5

Electromechanical coupling coefficient  $K^2$  of Rayleigh wave when ZnO thin film with Euler angles ( $0^\circ$ ,  $180^\circ$ ,  $0^\circ$ ) is formed on quartz substrate with Euler angles ( $0^\circ$ ,  $119.75^\circ$ ,  $35^\circ$ )

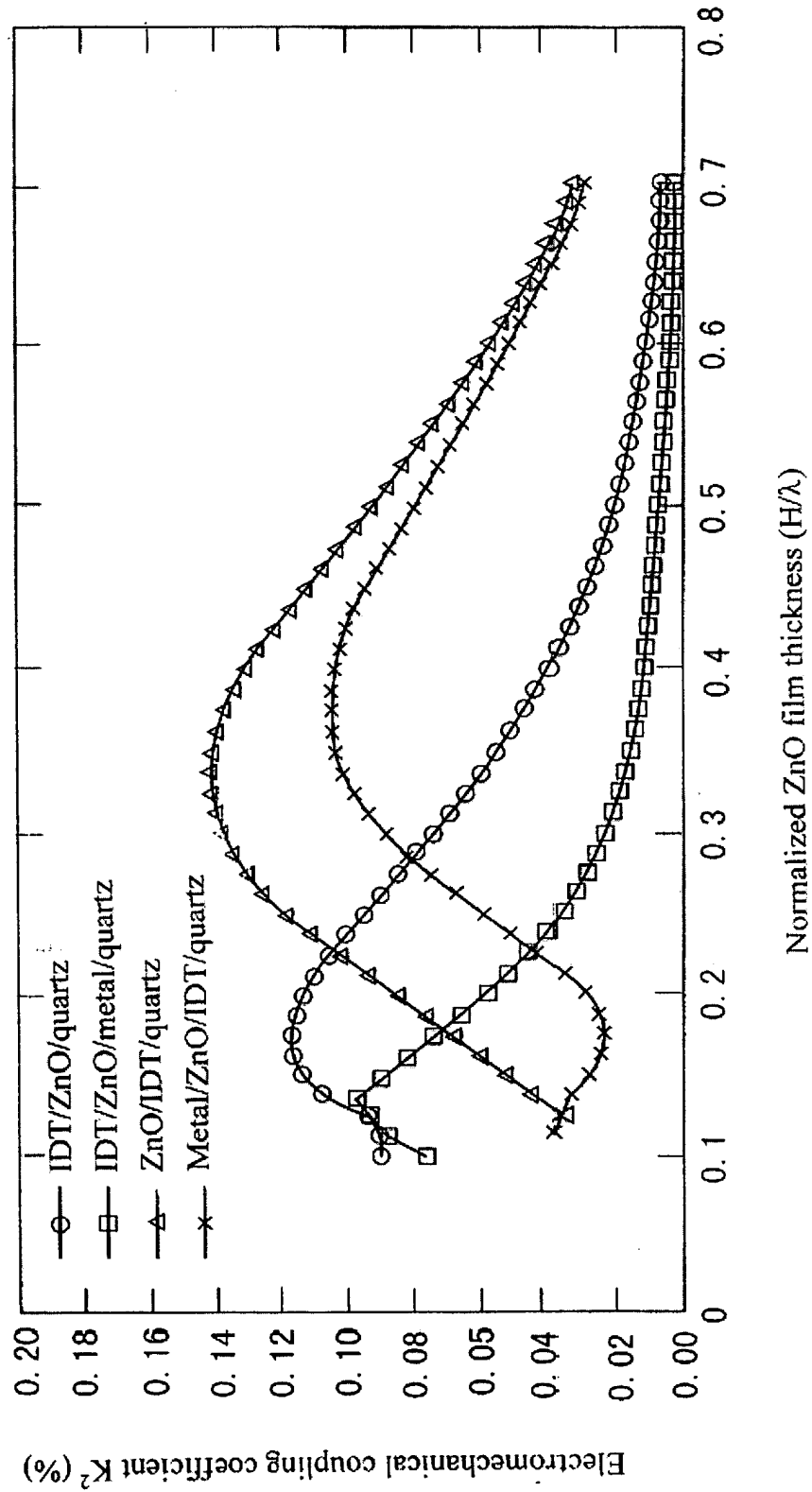


FIG. 6

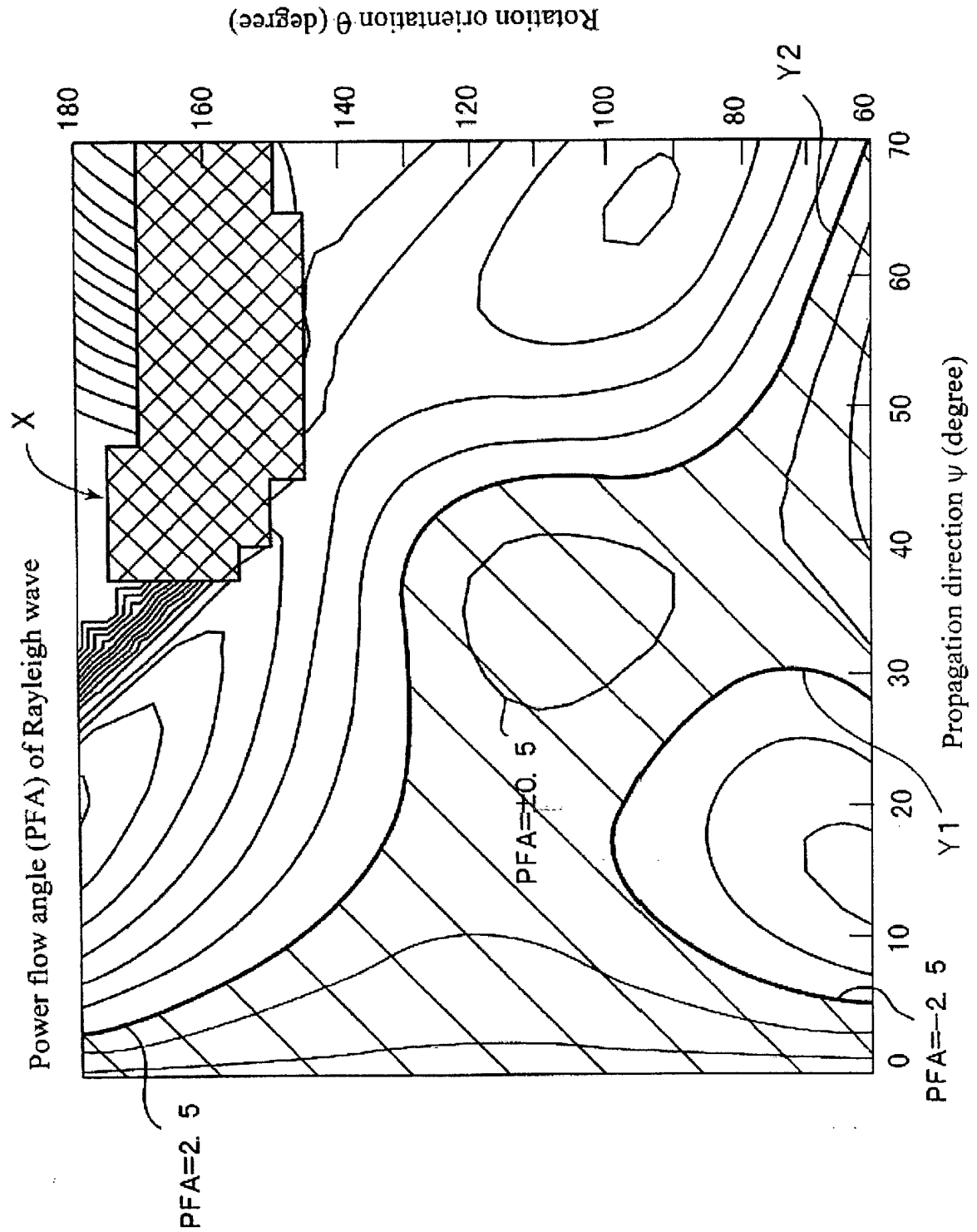


FIG. 7

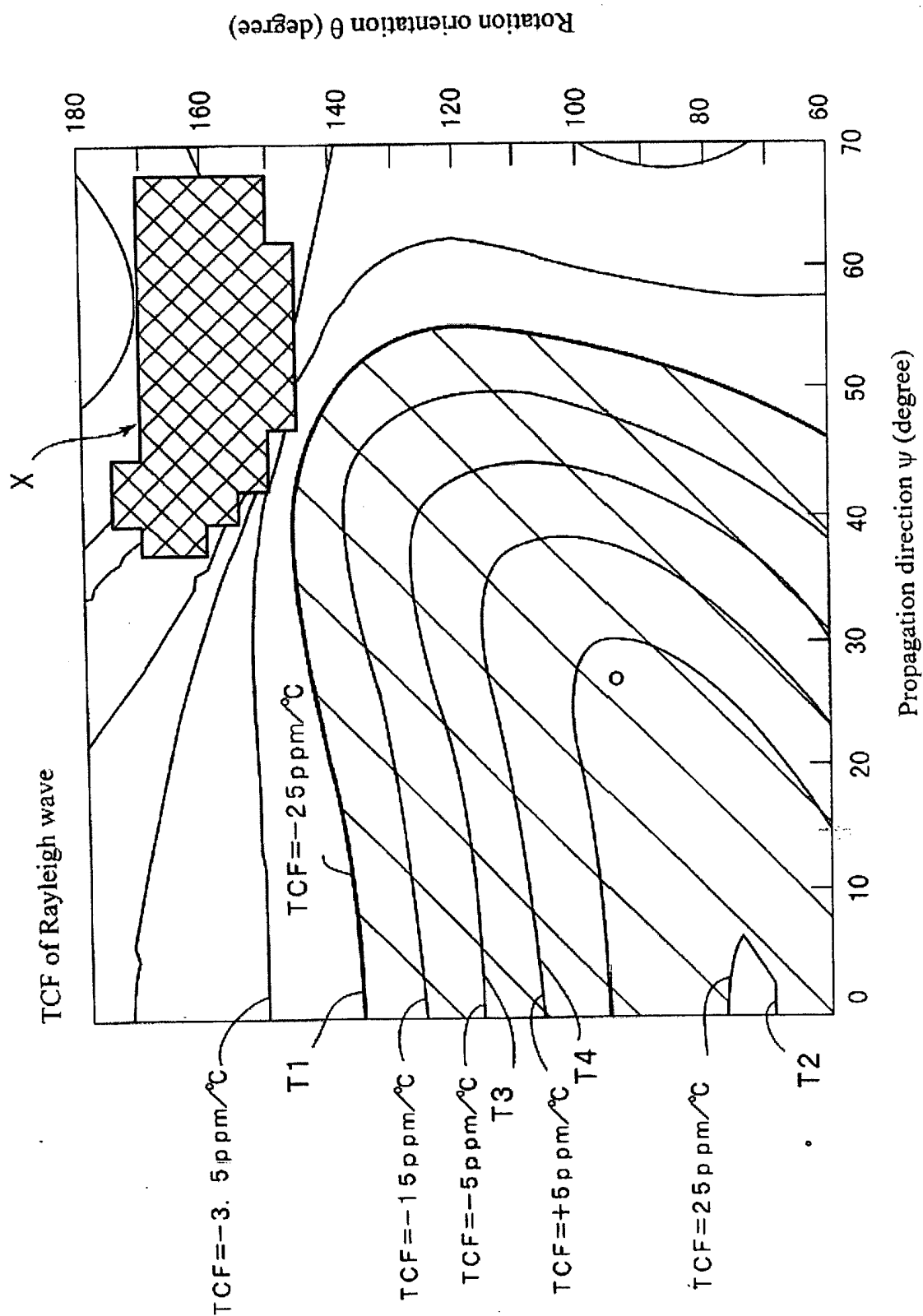
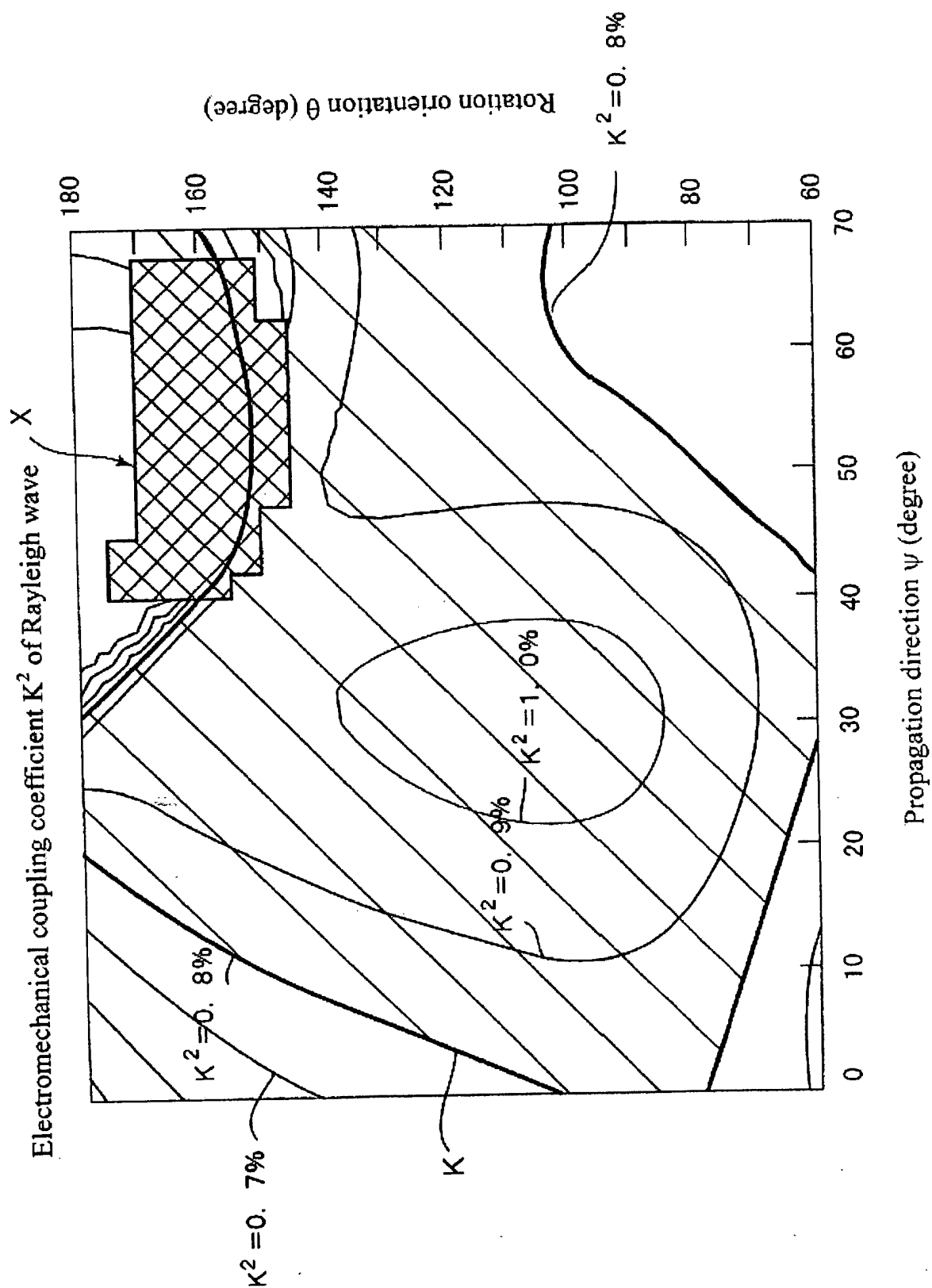


FIG. 8





Electromechanical coupling coefficient  $K_{sp}^2$  of spurious wave (%)

The figure is a contour plot showing the electromechanical coupling coefficient  $K_{sp}^2$  of a spurious wave. The vertical axis represents the rotation orientation  $\theta$  in degrees, ranging from 60 to 180. The horizontal axis represents the propagation direction  $\psi$  in degrees, ranging from 0 to 70. The plot features several contour lines representing different values of  $K_{sp}^2$ . A hatched rectangular region is located in the lower-left corner, labeled 'X'. Two specific points are marked: 'S1' at approximately  $\psi = 10^\circ$  and  $\theta = 65^\circ$ , and 'S2' at approximately  $\psi = 25^\circ$  and  $\theta = 165^\circ$ . Labels for  $K_{sp}^2$  values are placed near the contours:  $K_{sp}^2 = 0.15$  at the bottom left,  $K_{sp}^2 = 0.1$  near S2,  $K_{sp}^2 = 0.05$  in the center, and  $K_{sp}^2 = 0.05$  and  $K_{sp}^2 = 0.15$  on the right side. The text 'K<sub>sp</sub><sup>2</sup>=0.1 Propagation direction  $\psi$  (degree) S3' is written vertically on the far right.

Rotation orientation  $\theta$  (degree)

Propagation direction  $\psi$  (degree)

$K_{sp}^2 = 0.15$

$K_{sp}^2 = 0.1$

$K_{sp}^2 = 0.05$

$K_{sp}^2 = 0.05$

$K_{sp}^2 = 0.15$

S1

S2

X

$K_{sp}^2 = 0.1$  Propagation direction  $\psi$  (degree) S3



FIG. 10

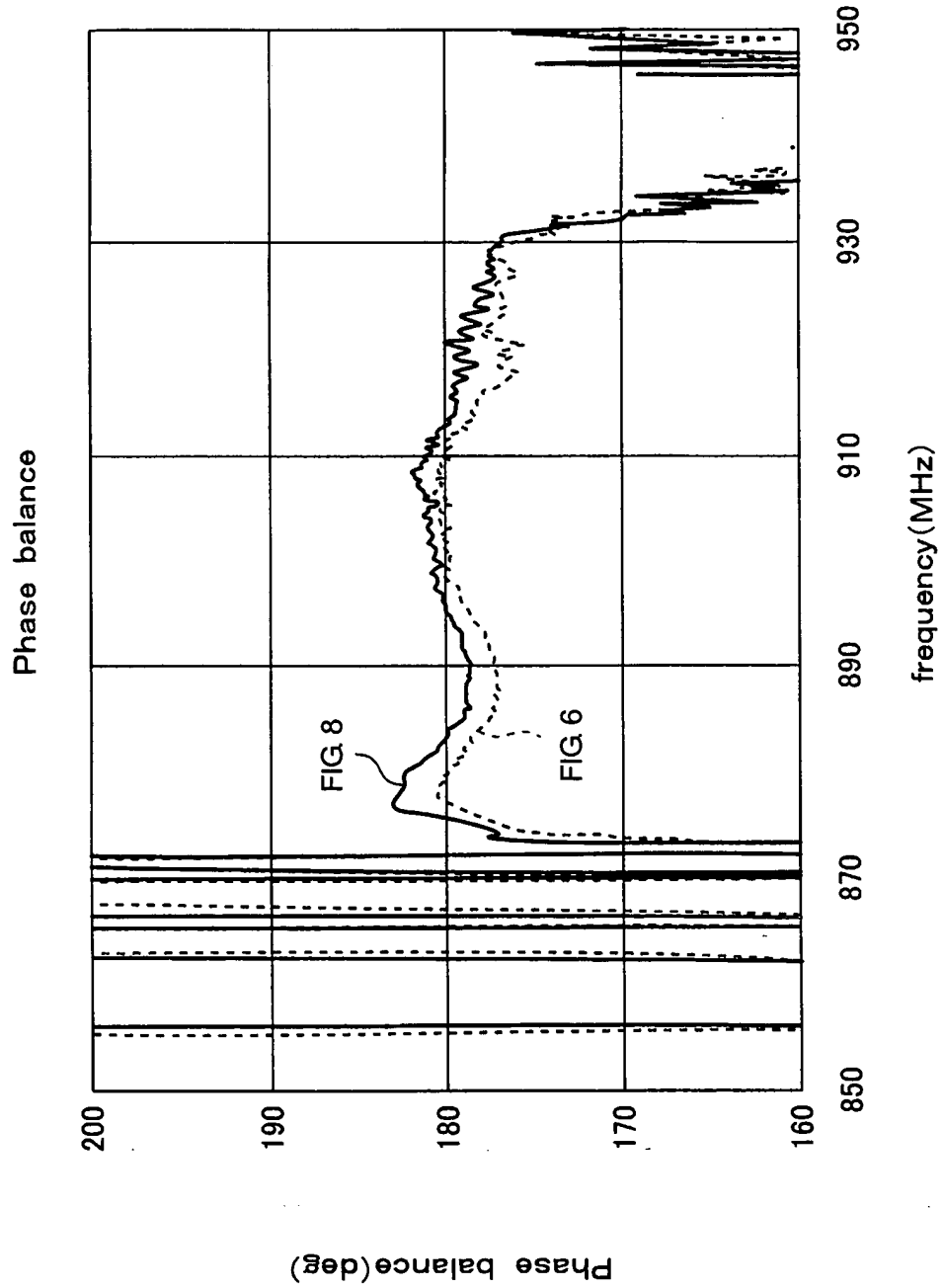




FIG. 11

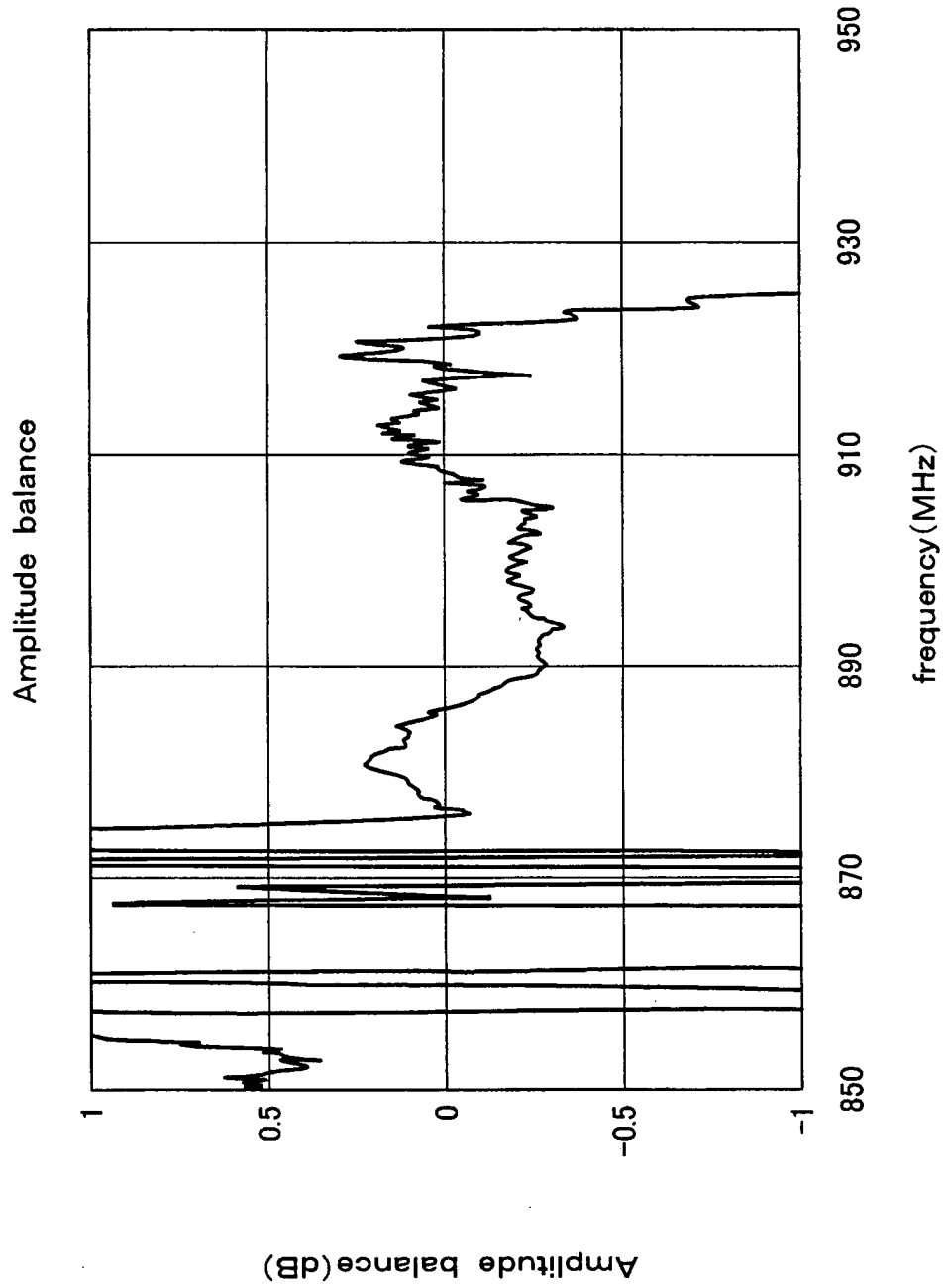




FIG. 12

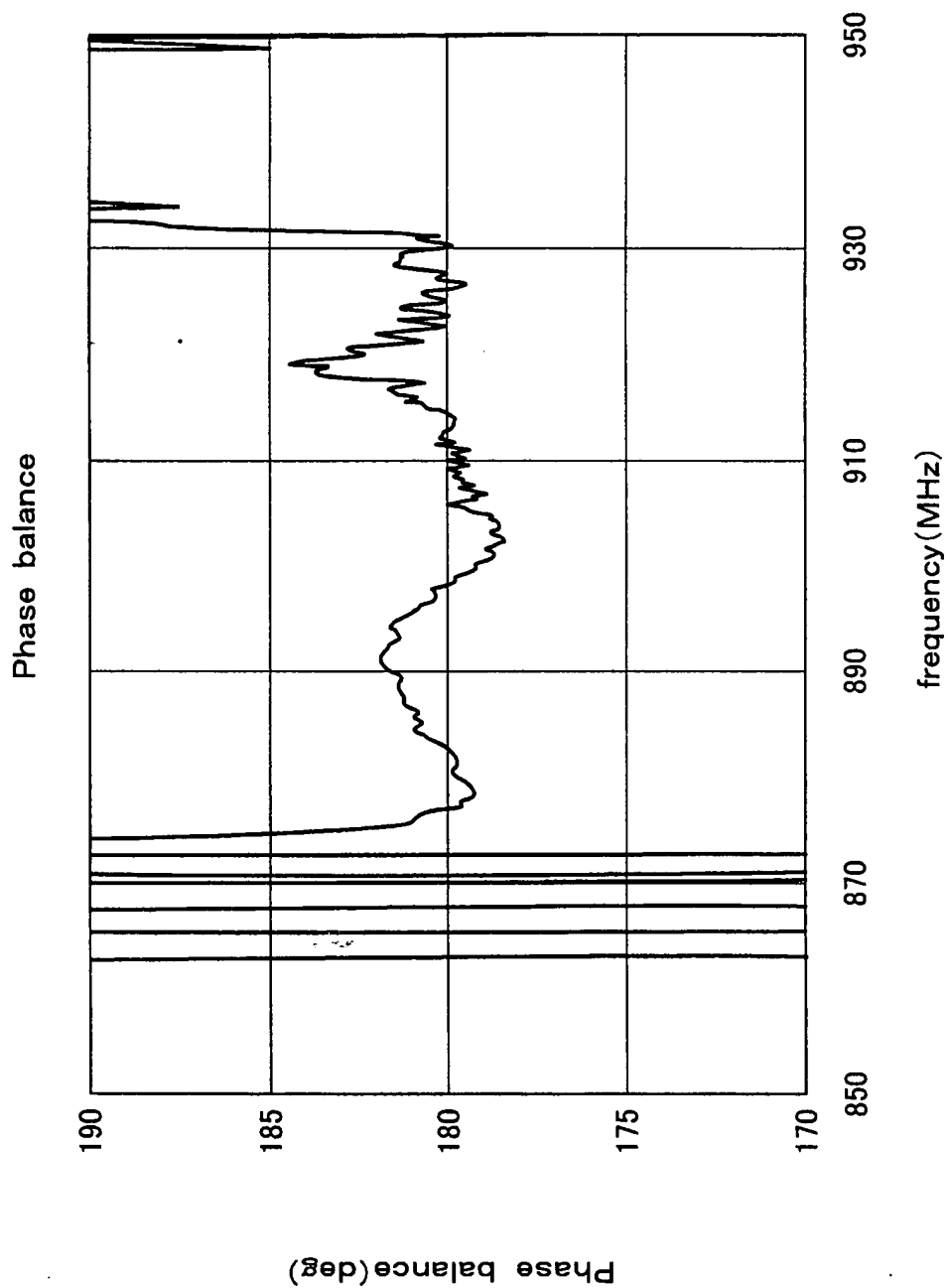


FIG. 13

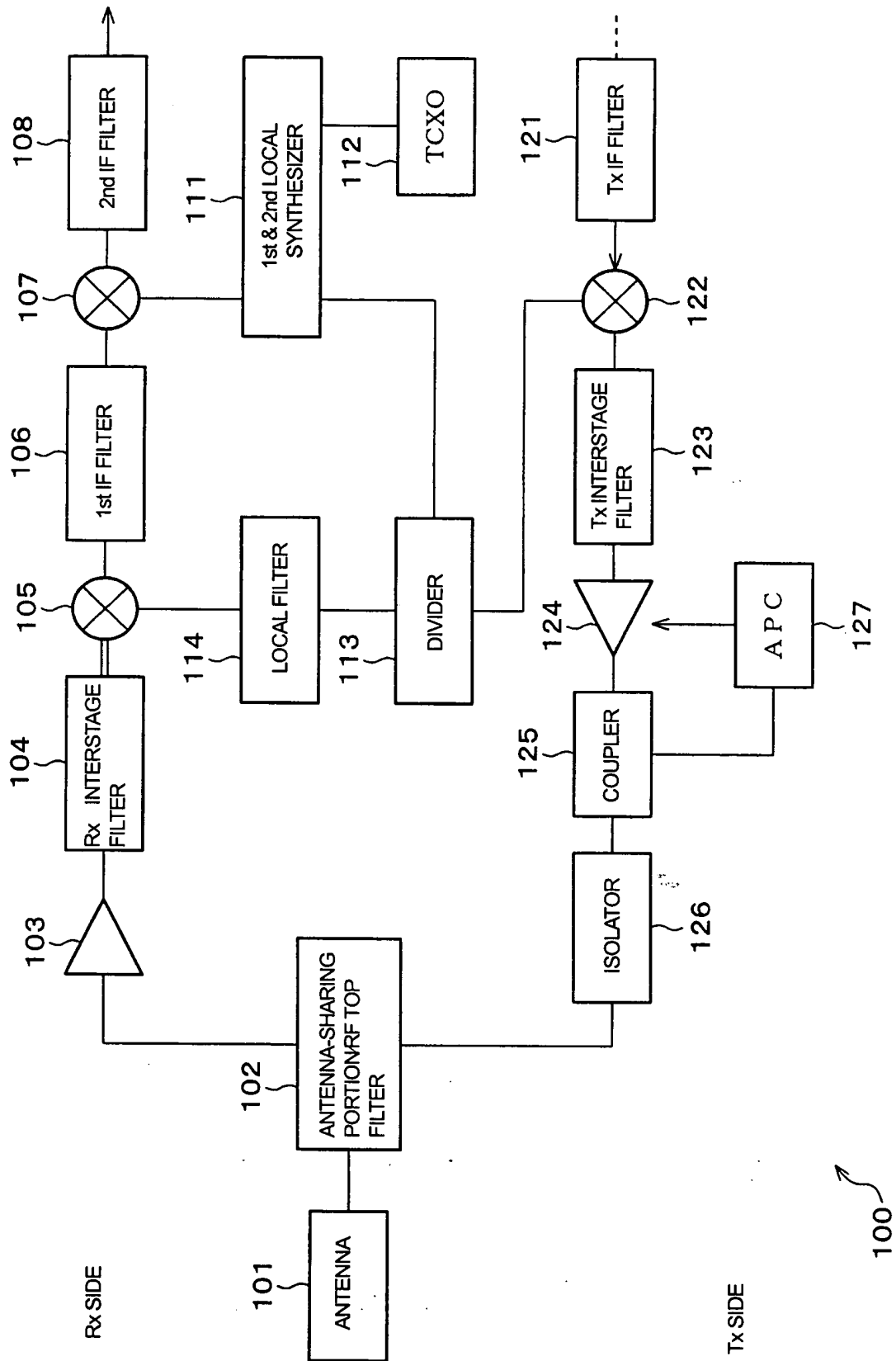


FIG. 14

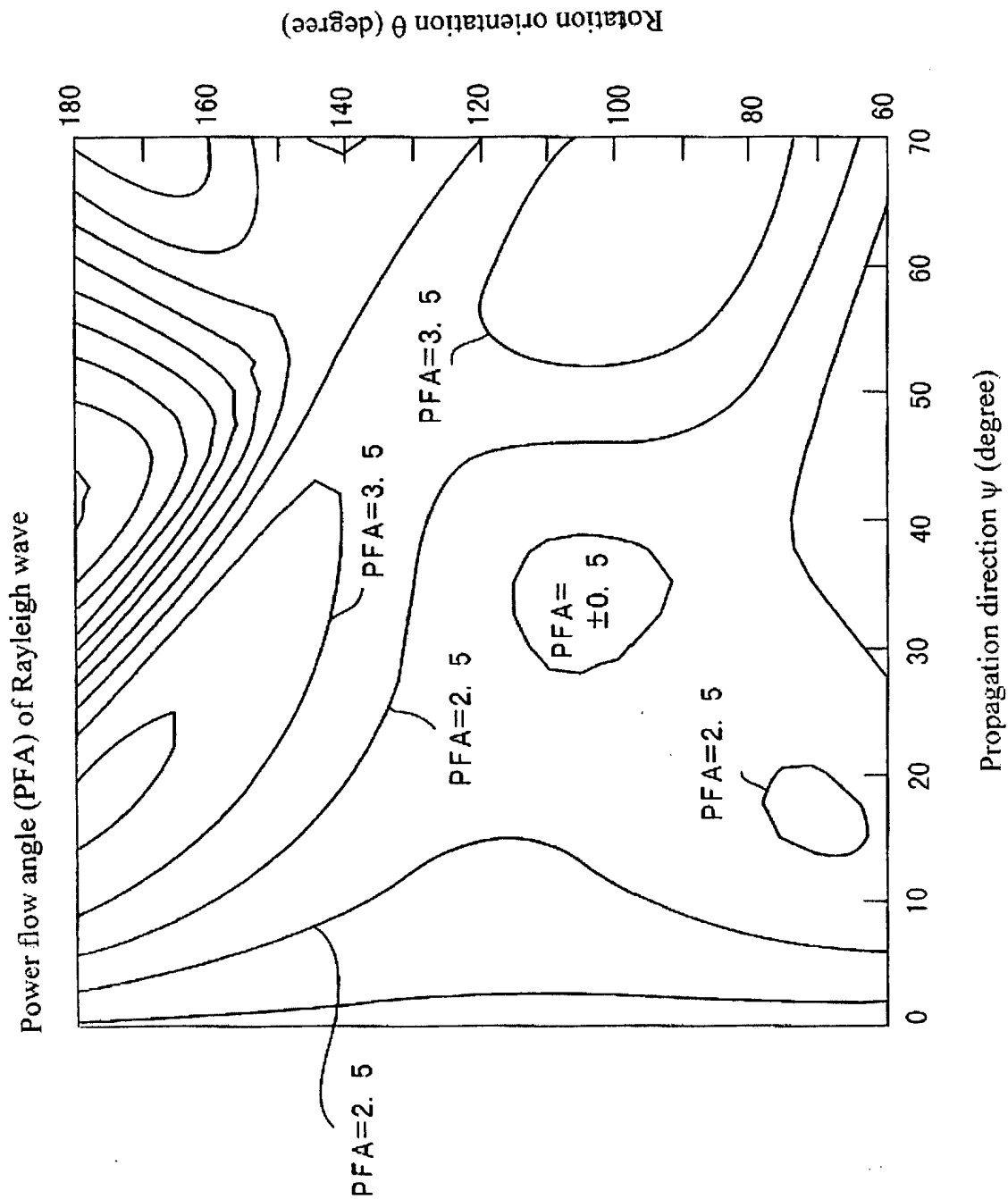


FIG. 15

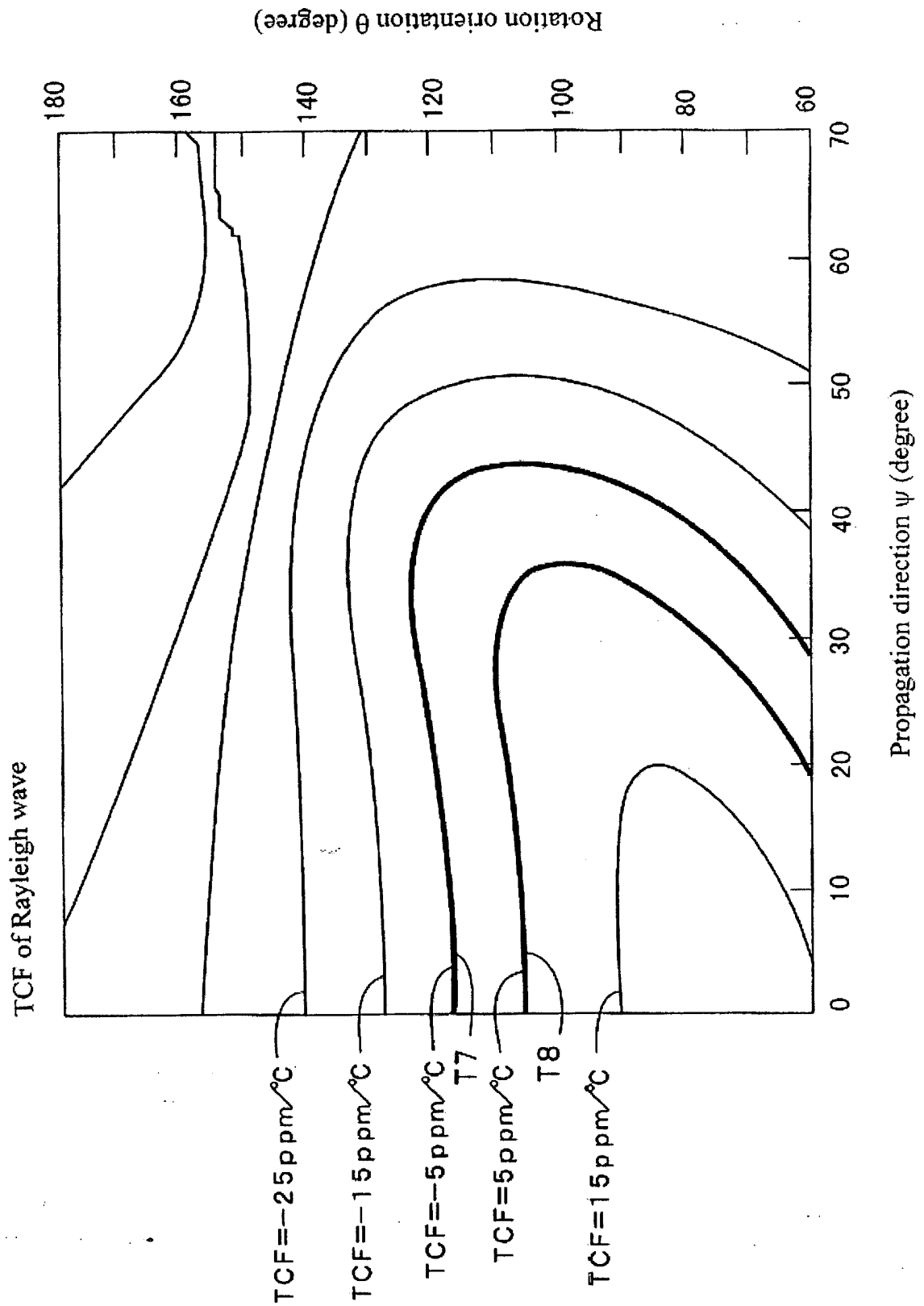


FIG. 16

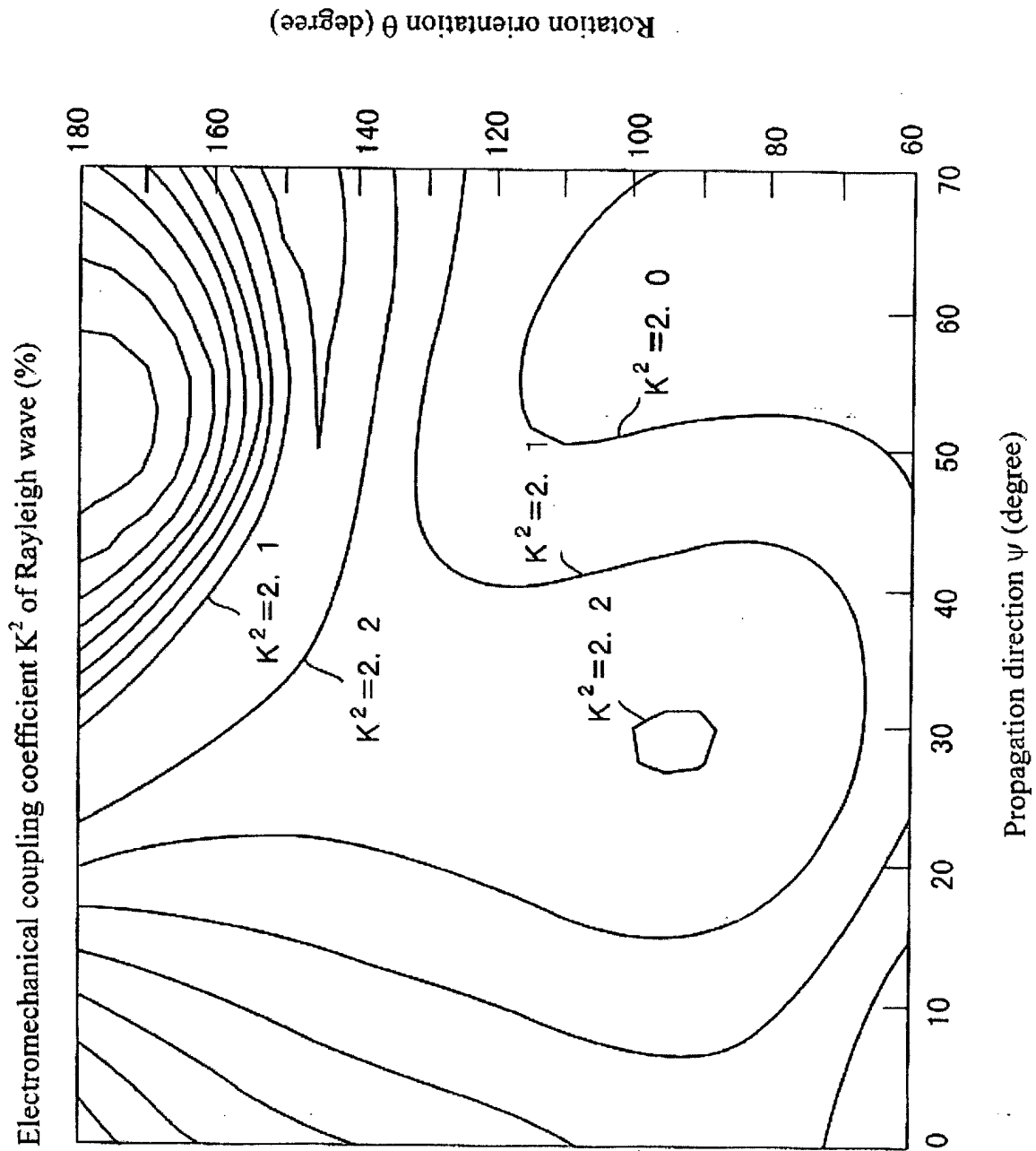






FIG. 18

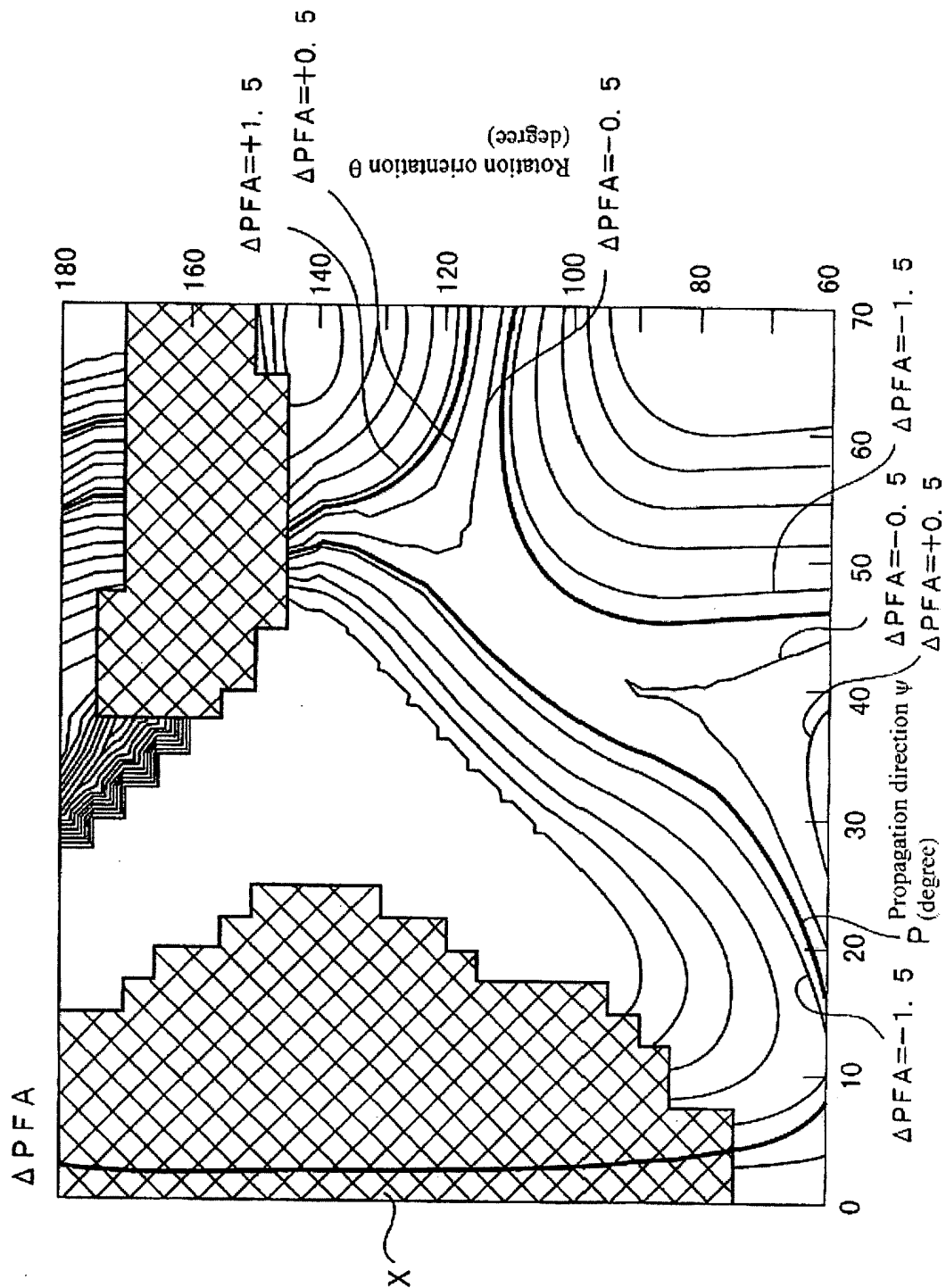


FIG. 19

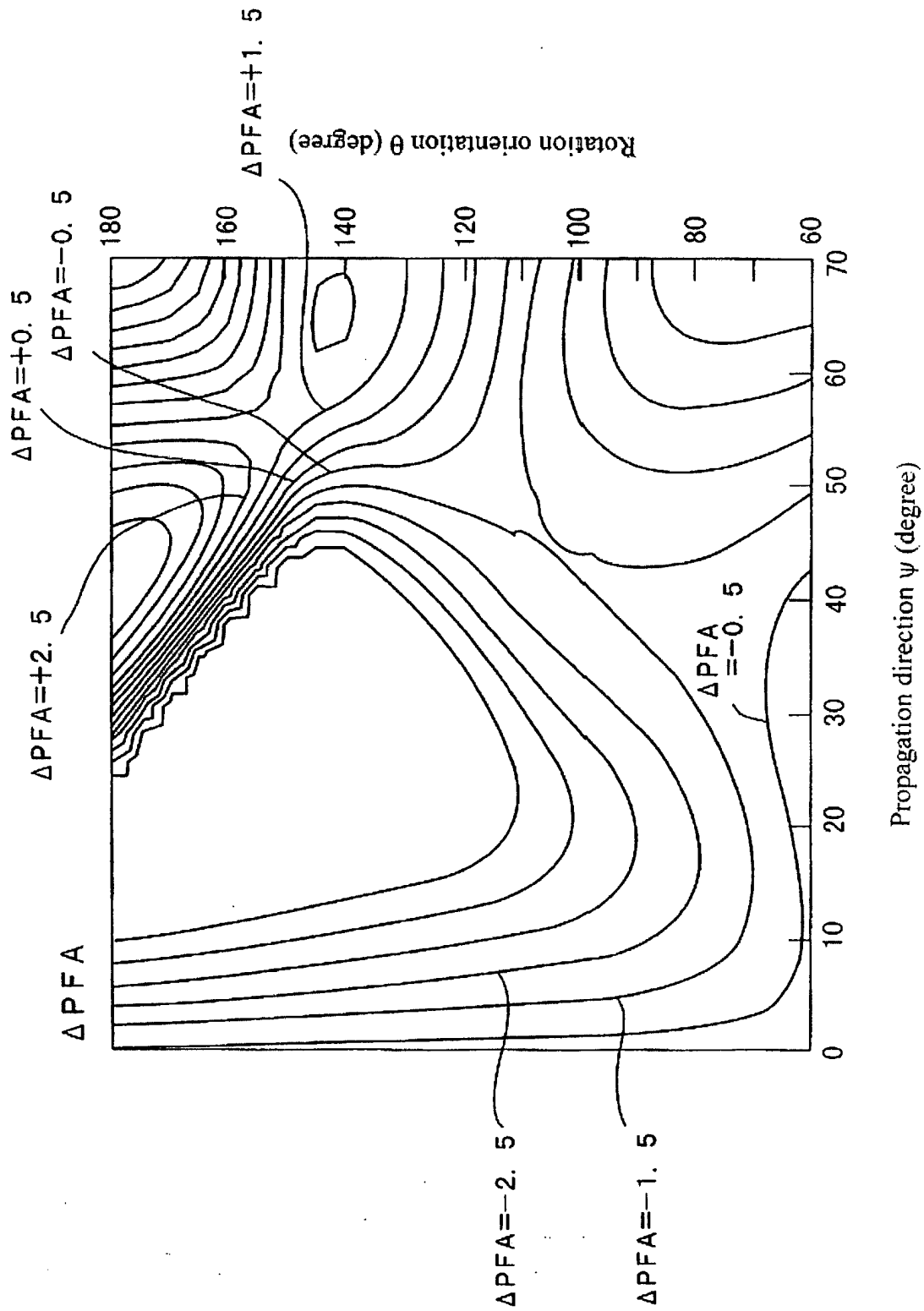


FIG. 20

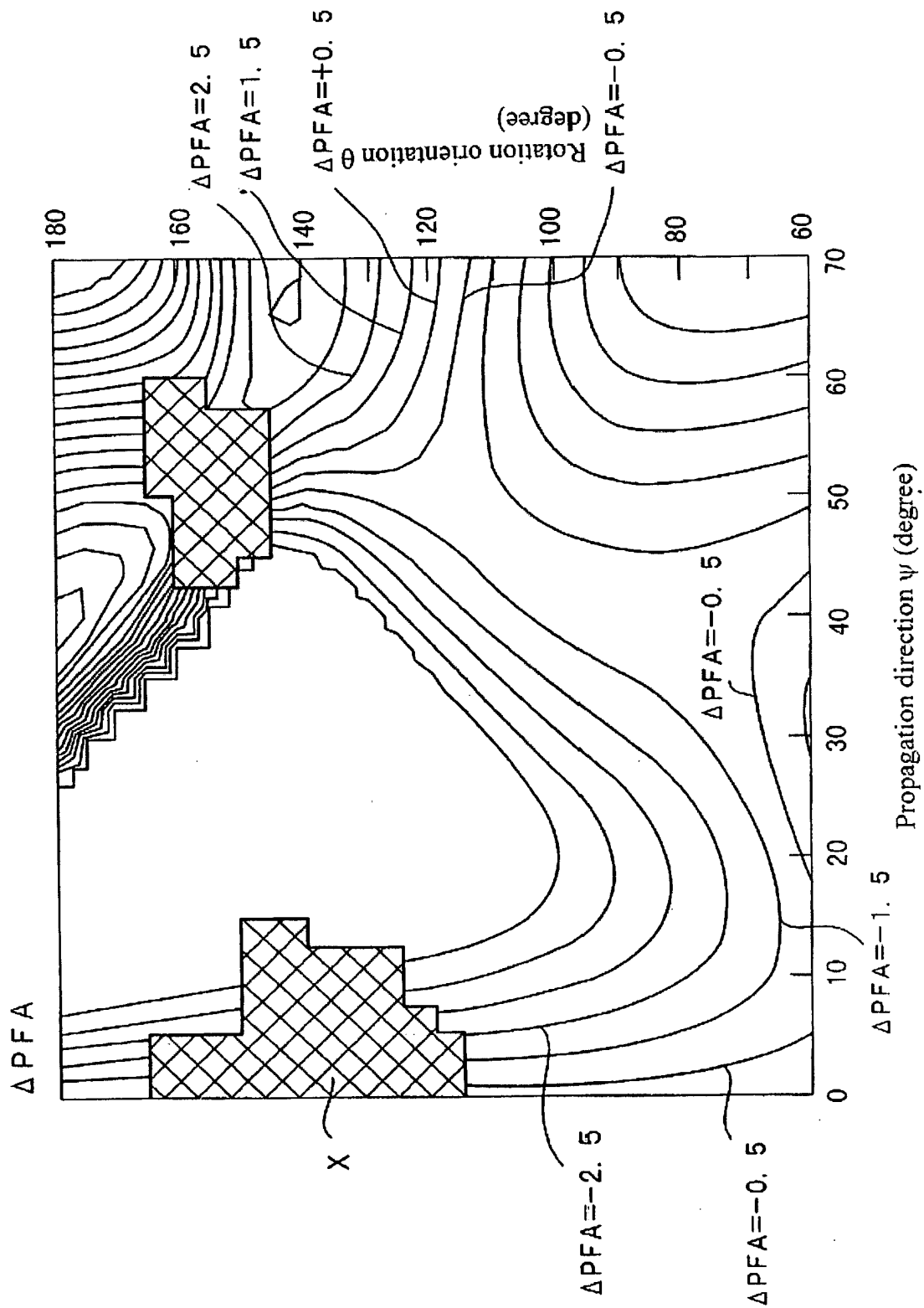


FIG. 21

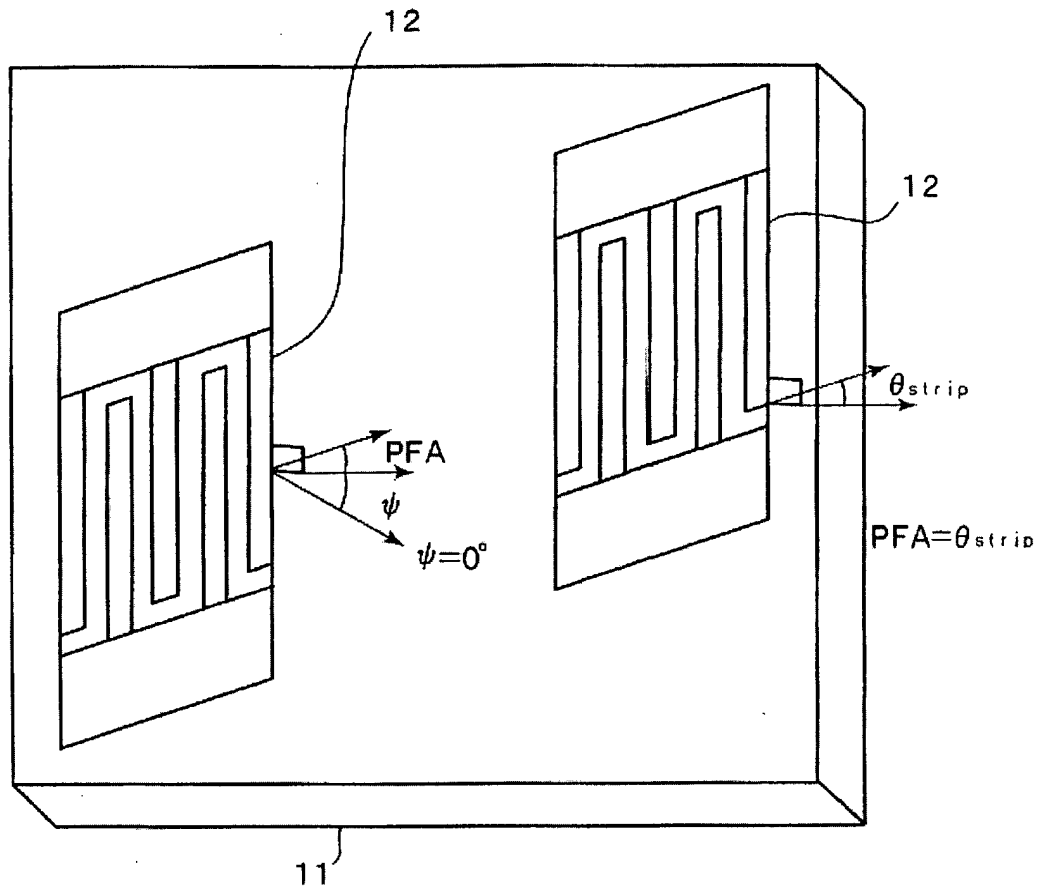




FIG. 22A  
PRIOR ART

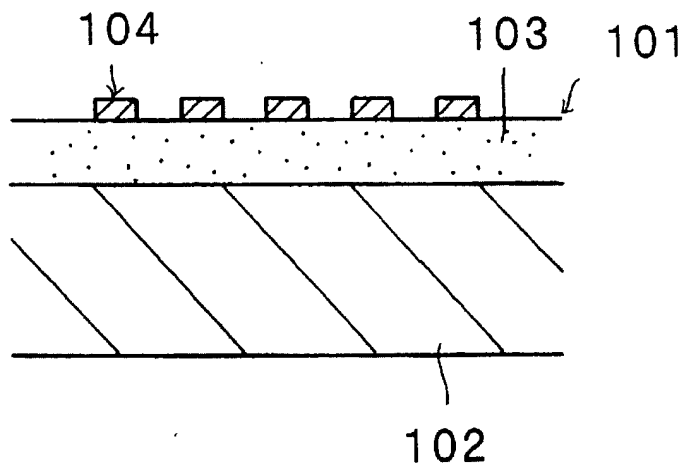


FIG. 22B  
PRIOR ART

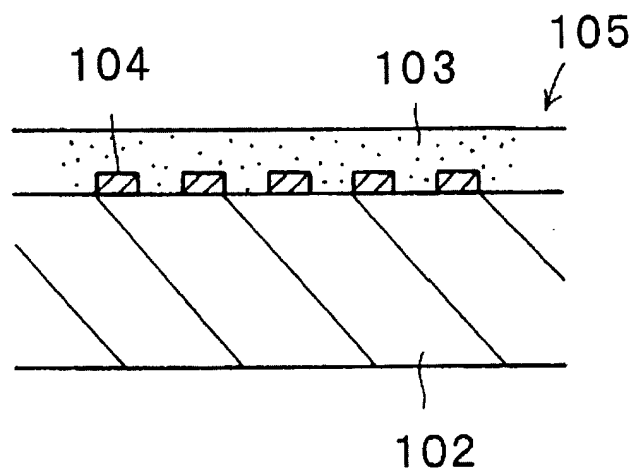




FIG. 23A  
PRIOR ART

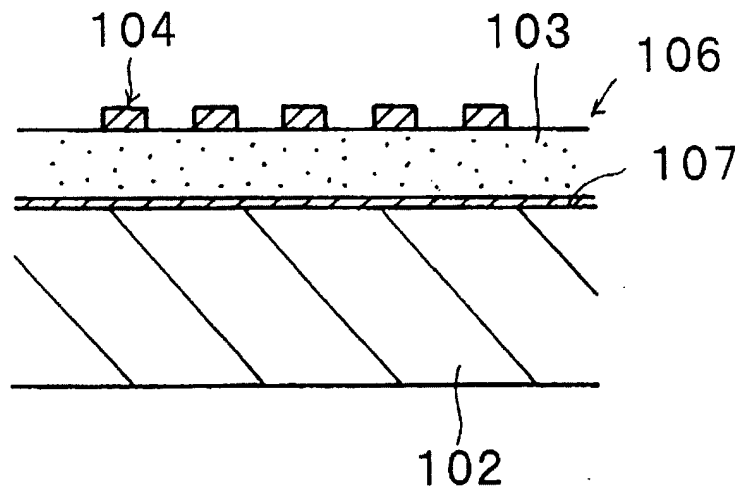
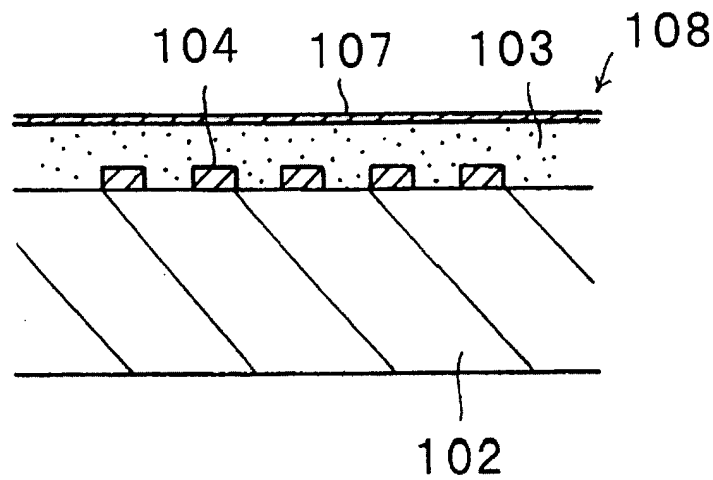
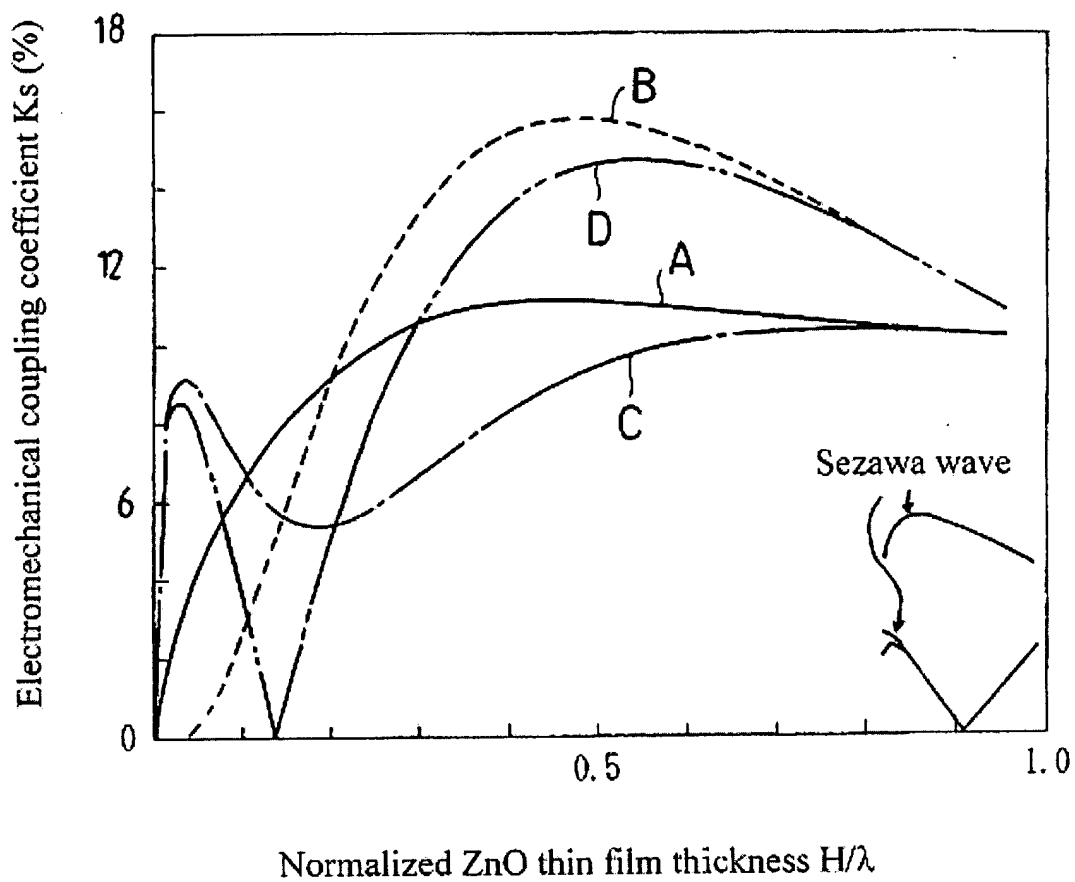


FIG. 23B  
PRIOR ART





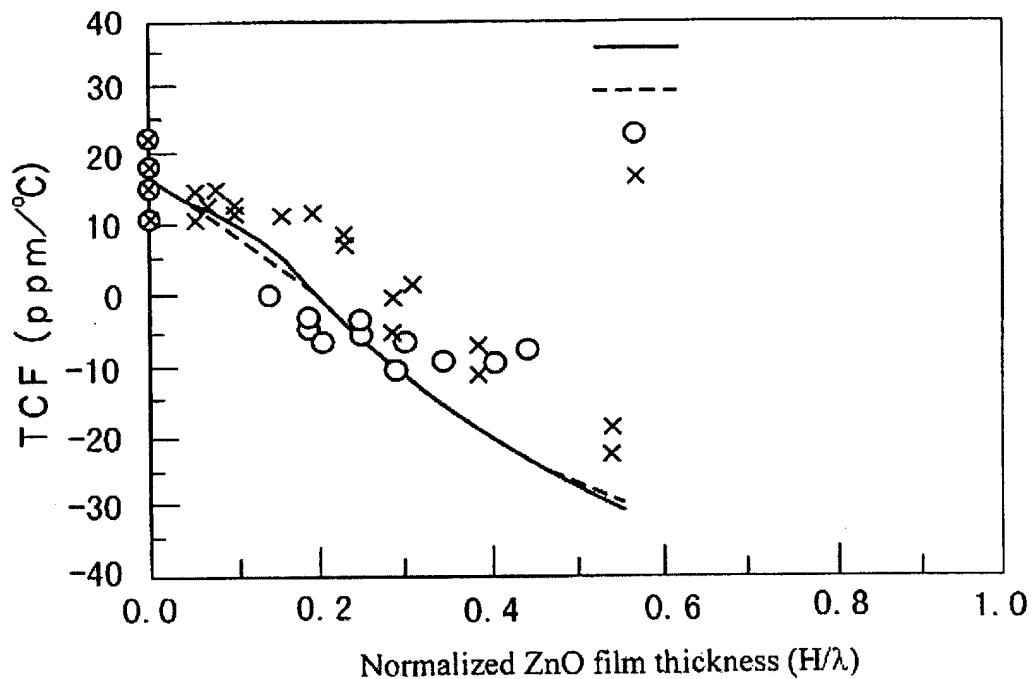
**FIG. 24**  
**PRIOR ART**







**FIG. 25A**  
**PRIOR ART**



**FIG. 25B**  
**PRIOR ART**

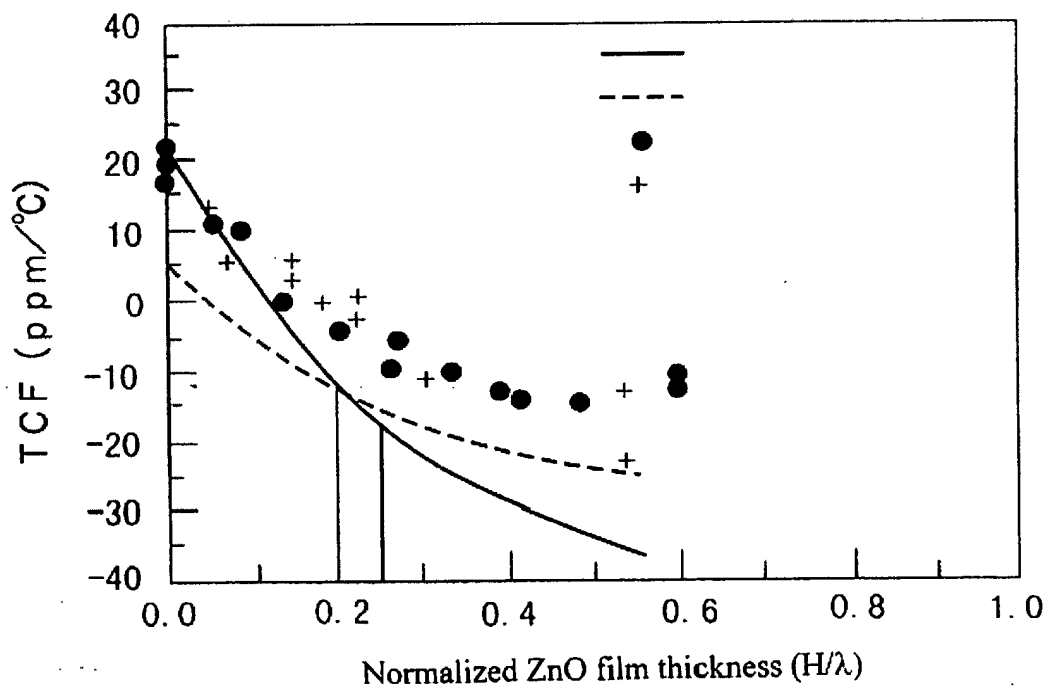




FIG.26  
PRIOR ART

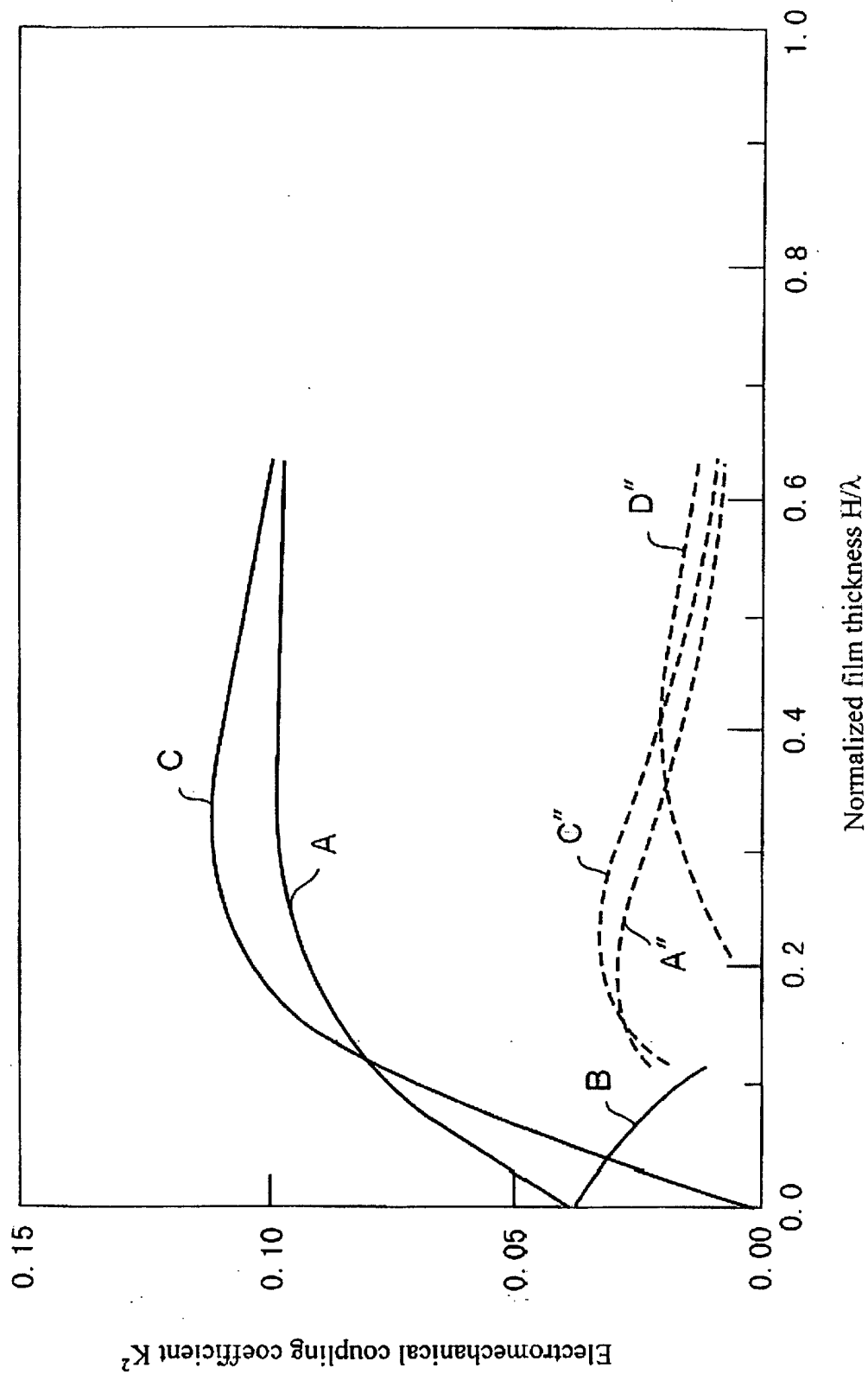


FIG. 27

